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School Grounds.

FOR several months in the year a large proportion of the children of this country spend at least half of the hours of daylight, for five days of the week, in or about the school-house. At the most susceptible period of life the influence of these surroundings must in the aggregate be considerable A neat and tidy room, with simple and cheerful decorations, will be a constant object-lesson to every eye. A room with decrepit furniture upon an unclean floor, and with walls and ceiling broken and stained, will teach its lesson, too, in taste and morals, but it will be quite a different one. It is due to the health of children that they be supplied with abundant light and air. This means a detached building, with ample, open space about it, even in the city. Exercise is also essential to the healthful development, as well as to the happiness of children, and play is the natural and spontaneous exercise and refreshment for both their minds and bodies. A playground may, therefore, be considered a necessary adjunct to every school. Children will play wherever they have room, but it will hardly be argued that a bare space of earth, which will be dusty or muddy as the weather changes, offers every advantage that children should be able to derive from their school-grounds. If the school-room can be made to give lessons in cleanliness and order and taste, the surroundings of the building should be arranged to enforce the same lessons.

That properly ordered school-grounds can aid in this direction, and, besides this, be made an important educational auxiliary in some branches of natural science, was the thesis of an interesting paper read two months ago before the Massachusetts Horticultural Society by Mr. Leverett M. Chase, Master of the Dudley School, in Roxbury. Mr. Chase argued that the ideal school-ground should be separated into two distinct portions—one devoted to the purposes of an out-door gymnasium, and the other an area of green sward, properly planted with trees, shrubs, vines—in short, a pleasure-garden for the children. They should be taught that the garden is theirs, and a feeling of responsibility for it should be encouraged. That this sense of ownership will engender such a personal interest that the exuberant destructiveness, so often manifested by school-boys, will give place to a sentiment of affection, and a desire to protect their shrubs and flowers has been proved in many instances. If the plants are all carefully labelled and catalogued; if the children are invited to aid in cultivating them, under proper direction, they will gain much practical information as to the laws of plant-growth, and if a serious attempt at systematic instruction in certain branches of botany is connected with the care of the grounds, many lessons which it would be an irksome task to acquire otherwise, will be learned without effort, and even with positive delight. From the knowledge thus gained, and the interest aroused in the school-garden, we may reasonably look for a growing love of Nature—an increasing appreciation of the beauty of trees and their value. If this generation of children were reared under such influences ours would be a land of fair gardens in a quarter of a century, and there would be no difficulty in securing proper legislation for the preservation of our forests. Indeed, it is to be feared that a distinctively American forest-policy which shall embrace in its scope the wisest administration of the nation's forests, and the most intelligent care of the farmer's wood-lot, will never be adopted until the interest and sympathy of the children are enlisted, so that they will grow up with sound views and generous sentiments as to the importance of trees and forests as an element of the national welfare.

Of course, grounds sufficiently spacious for a garden cannot now be found connected with every school-building, and in crowded cities large school-gardens will not be practicable. But there is room for a beginning everywhere. A narrow border along the foundation of the school-house may be made beautiful with flowers from the time when Snow-drops appear until frost kills the latest Aster. There are few school-yards where a place cannot be found for some tree or shrub, or where a vine cannot be trained so as to show its own beauty and hide some unsightly object. At all events, some house-plants can be used to brighten up the school-room and to illustrate by living examples the elementary facts in botany and horticulture. One disadvantage will be that the teachers and trustees who must take the lead in this enterprise know so little themselves of the subjects in which it is proposed to interest the children. The beginnings of this reform—for a genuine reform it will be—will be feeble and much honest effort will be misdirected. Unsuitable trees and shrubs will be often selected and they will be badly planted in improper places. But the very fact that the lack of knowledge on these points is so lamentable is the strongest reason that a beginning should be made. The attempt will excite inquiry and criticism, and knowledge will come from the study and discussion thus aroused. Fortunate are those places already provided with teachers like Mr. Chase, and Mr. Endicott, master of the Gibson School in Dorchester, who at the meeting above-mentioned added some valuable testimony to the soundness of the positions taken in Mr. Chase's paper.

A final suggestion made by Mr. Chase is worth considering in other States as well as in Massachusetts. It was that prizes be offered for the best-kept and most tastefully-embellished school-grounds.

Innumerable fires are, or a few weeks ago were, common sights in the suburbs of all our cities. These fires are set year after year to burn up the dead grass from lawns and fields and to get rid of dead leaves and other refuse. Such fires are dangerous and expensive. Where fires are used to clear up a piece of ground compost heaps are small, and year by year the land is robbed of its fertility; and such fires often get beyond control and injure shrubs and trees, or damage or destroy fences and hedges. The same practice prevails to a very large extent upon farms all over the country; and brush-fires set to get rubbish out of the way are the cause of nine-tenths of all the forest

conflagrations which occur in the farming-regions of the United States, and which every year sweep over tens of thousands of acres during the few weeks of dry weather, which follow the melting of the snow in spring before the appearance of the new leaves, which generally put a stop to these early fires. Rarely does a spring pass without the atmosphere over Long Island and New Jersey being filled with the smoke of forest-fires, which can be traced to this wasteful and careless method of farming; and what occurs in this neighborhood occurs pretty generally all over the territory of the United States wherever farms are cultivated. Such fires are set without much attention to the state of the weather or the direction of the wind; they are carelessly watched, or not watched at all, and soon reach leafless shrubs and trees, and a forest-fire which may sweep over thousands of acres is started.

Dead grass and leaves should never be burned. It is an expensive and wasteful custom, and a sure indication of extravagant and therefore bad management. Where it is desirable to make the ground about a house neat, or to prepare it for the lawn-cutter, the dead leaves and grass should be raked up into piles and carried away to the compost heap, or to be used for the bedding of animals. Such refuse material is well suited for this purpose, and should be freely used. The manure pile can be greatly increased in this way; or, if dead leaves and grass are piled up and turned over occasionally they will be converted into leaf-mould at the end of a couple of years, and so furnish the very best material possible in which to plant many trees and shrubs. A pile of leaf-mould is essential in every good garden, and the bigger it is made and the more freely this vegetable-mould is used, the better the garden will be. In the case of larger fields which cannot be raked over every spring, the dead grass and leaves should be allowed to remain on the ground, which they serve to mulch and enrich. It is a poor policy and thriftless management which burns up plant-food in large or in small quantities, and sooner or later it will make the best land sterile.

Very interesting is Bulletin No. 45, lately issued by Professor Beal, who is at the head of the Department of Botany and Forestry at the experiment station connected with the Agricultural College of Michigan, as well as one of the Directors of the State Forestry Commission. In an imaginary conversation a farmer in one of the older settled counties of the State is made to say:

"Generally, of late years, when there is a heavy fall of snow, it is soon so unevenly distributed that we have little idea of how much has fallen. It piles up along the north and south roads, and blows from some parts of the east and west roads. The wheat-field has many bare spots, while in other places the drifts are deep. Since I cut off that piece of timber down there and brought to view the farms over west for a couple of miles, the wind has frequently swept over my fields with a great deal of force, sometimes making things fairly jingle, and when cold, the air seems to penetrate the smallest cracks in my pens, sheds and barns. The pigs squeal, the cows give less milk, the horses shiver and even the hen-coop is too freely ventilated. I believe the animals at such times eat more grain and fodder than they do when there is less cold air in motion. The house, too, gets colder in the night than it used to when there were few strong winds. I am sure I have to lay in a larger supply of fire-wood than I used to. When I came to this neighborhood much of the land was still covered with a dense, virgin forest, and as one block of woods after another disappeared, I noticed the winds became more frequent and penetrating."

As a partial remedy against these winds which drift the snows and freeze out the wheat in winter, and shake off the fruit and lodge the grain in summer, the Bulletin suggests the planting of a grove to the west of the farm buildings. Professor Beal shows how little it will cost to plow a strip a rod wide and ten or fifteen rods long, to harrow it as if fitting the field for corn, and to plant in it small trees which can be bought in quantity at considerably less than a cent apiece. If the furrows are cut four feet apart, and a tree set every four feet in the row, they can be cultivated by horse-power for a few years, and will then furnish a screen as protection against the wind, a stick for a sled-tongue or vine-trellis now and then, and every autumn hickory nuts, walnuts and chestnuts in abundance for the children. Admirable directions for selecting trees for planting and caring for them afterwards are given, and the Bulletin will prove of value to many people besides those of Michigan, to whom it is particularly addressed.

The Gardens of Levens Hall.

THERE appeared in a recent issue of Garden and Forest a view of the terraced garden at Wellesley, Massachusetts—the finest example of topiary gardening in America. The illustration upon page 211 represents one of the best examples of work of this sort which exists in England—the old gardens of Levens Hall, near Milnthope, in Lancashire, a mansion which, it is said, dates in part from the eleventh century, and which is famous for its splendid old oak carvings. The gardens contain seven acres of clipped trees, planted and first brought into shape by the gardener of James I. A large part of these trees and of the grand old hedges which serve to divide the garden into different compartments are Yew and Box, although there are closely-clipped Hollies often more than thirty feet in height. Here are still preserved examples of the old pleached alleys of Shakespeare's time, and green paths laid down two hundred and fifty years ago on slate slabs, placed eight inches below the surface, once used for bowling-greens, and still as level as a billiard-table.

The Art of Gardening—An Historical Sketch.—IV.

Mesopotamia and Judea.

THE building of pyramidal hills for one purpose or another has not been confined to Mesopotamia, whence, of course, Jewish writers must have drawn such ideas as they expressed in the tale of the Tower of Babel. Nor has Babylon been the only place where these terraced hills have been laid out as gardens. The sides of the mausoleum of Hadrian, in Rome, now called the Castle of St. Angelo, were originally planted, in part at least; a garden similar to Nebuchadnezzar's is indicated, perhaps, in a vast temple inclosure which now stands in a ruinous condition on the island of Java; and—allowing for radical differences in vegetation—we may get from the terraced sides of Isola Bella in Lake Maggiore some idea of the effects which so delighted Alexander when he sought repose in the hanging gardens of Babylon.

Diodorus says that two other great gardens were ascribed to Semiramis. In approaching Chaone, a city of Media, he reports, she "took notice of an exceeding great and high rock, where she made another very great garden in the very middle of the rock, and built upon it stately houses of pleasure, whence she might both have a delightful prospect into the garden and view the army as they lay encamped below in the plain." And near Mt. Bagistan—on the high-road which led eastward from Babylon through what are now called the Koordish defiles—she laid out a garden "twelve furlongs in compass. . . . It was in a plain champaign country, and had a great fountain in it, which watered the whole garden." The flank of the mountain "towards one side of the garden has steep rocks" seventeen furlongs in height; and on this wall she caused to be cut a great relief depicting herself surrounded by one hundred of her guards, with an inscription recording the fact that she had ordered all the harness of her innumerable beasts of burden to be piled up and had used it as a stairway to mount to the summit of the rock. The latter part of this account is, of course, the purest fantasy. The great reliefs which may still be seen in a crumbling state at Behistan are of Persian origin, represent Darius Hystaspes triumphing over the "false Smerdis," and date, therefore, from about B. C. 500.* And the great gardens themselves, including one in Armenia, which was likewise attributed to Semiramis, may confidently be assumed of Persian origin.

Of Assyrian gardens we know even less than of Babylonian. Trees and vines are represented on the bas-reliefs in such a way that we must believe the king was accustomed to repose

* See Mrs. Mitchell, *History of Ancient Sculpture.*

beneath their shade.† The "sacred tree," which, in a conventionalized design, constantly recurs in scenes of sacrifice, doubtless indicates those sacred groves—used for religious rites by many Oriental nations, as well as by the Druids of the north of Europe—which had had their first origin in the tree-worship of primitive races. Royal lion-hunts are portrayed with landscape backgrounds, and may have taken place in parks especially prepared for the purpose, as we see the beasts being freed from cages, and as such hunting-parks are described in the annals of the later neighboring kingdom of Persia. Moreover, it is impossible to doubt that the vast open courts which formed such a conspicuous feature in Assyrian palaces, and even the flat roofs, were adorned with a multitude of trees, shrubs and flowers. No pleasure-loving Oriental would dispense with their presence if they could possibly be had; house-top and court-yard gardening is still a familiar practice everywhere in the East, and nowhere could it have been elaborated on so magnificent a scale as in these vast royal residences, set on their high artificial hills. But with regard to the character of Assyrian gardens we know nothing except that they must have been formal, architectural in arrangement; nor can we say much more of the plants that filled them than that the Palm, the Cypress, the Vine and the Pine were prominent.‡

Dwelling amid more varied and picturesque surroundings that the Egyptians and Mesopotamians, the Jews can have felt, no such imperious desire to create large parks and gardens. Nor were they a people given to sumptuous forms of private life, nor did their religious ritual sanction a systematic use of flowers in its ceremonials. As we might expect from these facts, there is little evidence to show that gardening art was largely practiced in Judea. Like all other races the Hebrews did, indeed, imagine that the first man lived in a garden, but its charms are not dwelt upon as, for example, Homer dwells upon the charms of the gardens he mentions. We can but divine that the Garden of Eden was thought to have been formally disposed with the Tree of Life in the centre, four great rivers flowing in four different directions, barriers all about it, and a gate which could be closed. The idea we have to-day of Eden comes not from the Bible's, but from Milton's pages.

When the riches and happiness of Job are declared we read nothing of natural beauties or of works of art—his treasures seem to have been flocks and herds and the mere consciousness of great wealth. When the building of Solomon's temple is described in Chronicles and in Kings there is no word about gardens or plants; nor is there in the elaborate account which Josephus gives of this temple and the monarch's palace. We are told that Solomon wrote about plants "from the Cedar tree which is in Lebanon to the Hyssop that springeth out of the wall;" but he wrote also "of beasts and of fowls and of creeping things and of fishes," and we must imagine a scientific, not an æsthetic or horticultural treatise. When it is said, again, that "Cedars made he to be as the Sycamore trees that are in the vale for abundance," not growing trees are denoted but materials for building.§ Unlike the sacred tanks of the Egyptians, Solomon's was a great lifted basin, and we cannot fancy that plants grew in it or around it.

Of course these omissions do not indicate that gardens were unknown in Judea. Casual references to them are not infrequent in Holy Writ, and "the gate between two walls which is by the king's garden" is more than once mentioned—for example, in the account in II. Kings of Nebuchadnezzar's attack upon Jerusalem. This royal garden seems to have been near the pool of Siloam, where the valleys of Jehoshaphat and Ben Hinnon meet, and to have been approached (Neh. iii. 15) by stairs that went "down from the city of David." Josephus tells us "there was a certain place, about fifty furlongs distant from Jerusalem, which is called Etham; very pleasant in fine gardens, and abounding in rivulets of water." Thither did King Solomon "use to go out in the morning, sitting on high in his chariot." The commentary, called the Mishna, says there was a Rose-garden westward of the temple mount which had existed from the time of the prophets within the city walls—an exception to the usual Jewish practice of constructing gardens in the suburbs. In the Book of Esther the king comes "into the palace garden," and a great feast is held "in the court of the garden of the king's palace;" but the scene of this story is laid in Persia, not Judea. The Garden of Gethsamane seems to have been but an Olive-orchard.

New York. *M. G. Van Rensselaer.*

† As an instance of the inaccuracy of classic writers it may be noted that Strabo says the Vine did not grow in Susis "before the Macedonians planted it, both there and in Babylon." Yet Vines with their leaves and clusters of grapes accurately displayed may be seen on reliefs from Kouyundjik, now in the British Museum, which date from the period of Assyrian supremacy; and whatever was known in Ninevah must have been known in Babylon and all adjacent Asiatic countries, especially so all-important a plant as this.

‡ The Pine cone appears as an adjunct to sacred rites in Assyria, as the Lotus-flower does both there and in Egypt, held in the hand of priest or king.

§ It would be interesting to know just what trees are meant by Josephus when he speaks of the Pine trees which were brought to Solomon from Aurea Chersonesus. "Let no one imagine that these Pine trees were like those which are now so named, and which take their denomination from the merchants, who so call them that they may procure them to be admired by those who purchase them. For those we speak of were to the sight like the wood of the Fig tree, but were whiter and more shining. Now we have said thus much that nobody may be ignorant of the difference between these sorts of wood, nor unacquainted with the nature of the genuine Pine tree."

Chrysanthemums in the Imperial Garden at Akasaka, Tokyo.

THE following is a translation from *Hochi Shinbum*, the *Tokyo Post*, of an account of the latest of the famous annual Chrysanthemum shows in that city. The translation was made by Mr. K. Miyabe, the Japanese botanist now in Cambridge, Massachusetts.

According to the yearly practice, the gardeners in Tokyo and Saikyo raised many rare and splendid varieties of Chrysanthemums for the Imperial Garden by the special order. On the 8th of November the members of the cabinet, the foreign ministers and a few others were invited by the court to the "Chrysanthemum Banquet." On the day following, the higher officers of the government and nobles were allowed to see the show.

The following accounts are written from what we have heard from one who enjoyed this special privilege: The first bed, eighteen by 120 feet, was placed just behind the Senkinkaku (arbor). The entire bed was roofed with screen mats made of reeds, in order to protect the flowers from frost and sun. From post to post on three sides of the bed a curtain or screen, made of purple silk, with the imperial badge, the Chrysanthemum, relieved in white, was tied round with crimson tasseled ribbon. The flowers were at their prime. They were of different colors, and their diameters seemed to be about three to four inches. Several hundred of these plants were arranged without any regular order in the bed. Among them, one called the Sugawara, with petals red inside, and yellow on the outer sides, and the Kagaribi, with its crimson flowers, attracted a great deal of attention.

The next bed to the left was roofed with oiled-paper screens, the rest of the surrounding structures being just the same as the first. In this bed all those varieties having the filiform petals were arranged. A white flower called the "Aunobiki" is worthy of note; the petals were fine as threads, drooping down in tassels like a water-fall. One variety with crimson petals tipped with yellow was very conspicuous.

To the right of Shuhotei there was one bed twelve by sixty feet, planted with thirteen different root-stocks, each supporting numerous grafted branches rising from the stem a little above the ground, and crowned with flowers of different colors and shapes.

Next, to the right, was a bed (eighteen by sixty feet) for large-flowered varieties.

Parallel to this was a bed in which only three plants were set out. The first one, called the Golden Dew (*Ogonno Tsuyu*), was decked with 338 blossoms, all golden-yellow. The next named, the Hanakai, had 253 blossoms of red color. The last, the Sanono Watari, was covered with 173 white blossoms, and impressed one as the best of the three. The flowers were all about one and one-fifth of an inch in diameter.

The next bed contained about 420 plants of about sixty different varieties. Each plant was allowed to bear only one flower, and the diameter of the flowers was mostly about fifteen or sixteen inches. This bed seemed to be the crowning show of the day. The banquet was held in an arbor set up on the lawn just in front of this bed.

Foreign Correspondence.

The Kew Arboretum.—V.

IN England the words Pine and Fir are very frequently used without any definite idea of their meaning; indeed, some people make them apply to almost any Coniferous plant. Even nurserymen and foresters use the word Fir indiscriminately for both the Spruces (Piceas) and the Silver Firs (Abies). Cobbett, in "The Woodlands," published by him more than sixty years ago, includes Pines in his sweeping condemnation of the "villanous race of Firs." That energetic writer expresses himself in terms as vigorous when occupying him-

self with trees as he does when, in his "Weekly Register" or "Twopenny Trash," he baits the government which prosecuted, fined and imprisoned him. The subject of these notes will be the Pines in the Kew Arboretum, of which it will be impossible to do more than give a few hasty sketches. Independently of isolated examples of many species scattered over the whole of the Kew domain, the Pine collection proper is arranged along the side and end of a fine stretch of ornamental water almost in a line between the great Palm Stove and Sion House, the residence of the Duke of Northumberland, on the other side of the river Thames. Probably the largest number of species and varieties of the genus Pinus are to be found here—represented, as a rule, by a good group of each species, and a few plants of each form—than in any other garden in existence. The only conspicuous absentees are many of the long-leaved Mexican species which, unfortunately, are too tender to withstand the cold of the Kew winters. They, however, thrive in the extreme south-west of England, and especially near some of the lakes of northern Italy.

The Scotch or Wild Pine (*P. sylvestris*) is a very widely-distributed plant, and stretches from northern and central Europe through the Siberian forest-region as far as the Amoor River. Practical Scotch foresters seem to agree that in a given time this Pine produces more timber than any other tree known to them. I do not know whether any experiments on a sufficiently large scale have been made to test the value of Cobbett's statements about the "worthless and villanous Scotch Fir." He says: "I will show that the country would have been worth a hundred million of pounds sterling more than it now is, if this sort of tree (the Locust) had, during the last forty years, been cultivated instead of the villanous race of Firs." In any case the Scotch Fir is a handsome tree, with its tall, erect trunk clothed with bark of a warm, red tint. Several curious varieties are growing well at Kew, notably the variety Aurea, which, at the present time, is most conspicuous on account of the bright golden color of its leaves; when growth commences the yellow disappears, and during the summer and autumn months—indeed, until the winter again arrives—the trees of this variety are hardly distinguishable from the ordinary type. In *P. sylvestris argentea* the upper halves of the young shoots are creamy white. A form called Globosa is a compact-growing bush with short, glaucous leaves, and so like the New Mexican *P. edulis* in general aspect that the two have frequently been mistaken for each other by Conifer-loving visitors.

The Austrian Pine (*P. Austriaca*) is a fast-growing tree with rigid, sharp-pointed, blackish-green leaves densely clothing the branches. As a nurse or shelter-tree or for forming screens it is an excellent Pine, but the timber is inferior to that of *P. sylvestris*. Of this there is a golden form, which is very effective on some soils. Some authorities make *P. Austriaca* a variety of the Corsican Pine, *P. Laricio*, of which a remarkably fine specimen—interesting, also, from an historical standpoint—grows near the principal entrance to the gardens on Kew Green. The Corsican Pine is a very fast grower, and has attracted the attention of foresters of late years, and where the Larch has failed on account of disease, it has been recommended as the best substitute. It is often, however, difficult to transplant. *P. Laricio pygmæa* is a dense, compact, dwarf form, apparently never exceeding a man's height.

The Aleppo Pine (*P. Halepensis*), a native of the Mediterranean region is not a handsome tree, but is interesting as having claims—according to some commentators—to be the Pine or Fir of Scripture. Amongst rocks on the Mediterranean shores it thrives where scarcely any other tree can grow, and often forms highly picturesque objects. In Britain it is useless either for timber or landscape purposes.

Of the Stone Pine (*Pinus Pinea*) many fine specimens exist at Kew. Those who have learned of the quite recent disappearance of "Ravenna's immemorial wood," a forest of Stone Pines whose praises were sung by the classical Latin poets, may well feel surprised that the succession of cold winters which destroyed the famous Ravenna forest spared the Kew plants, so much further north. Not many years ago the eatable seeds yielded a large revenue to the Italian province.

Pinus Cembra, the Arole of the high Swiss regions, is a handsome, slow-growing Pine, with deep-green leaves and elongated pyramidal outline. According to Dr. Christ, in his "Flore de la Suisse et ses Origines," the Arole will ere long disappear from Switzerland unless specially protected and planted. Self-sown seedlings, except in one or two of the almost impenetrable forests of central Valais, are very rarely seen; the mountain black squirrels eat the cones before they ripen, and what escape the squirrels are eagerly collected by the peasants for food. The cones ripen the third year, and the large seeds take a year or more to germinate. In the Swiss nurseries, to protect the seed-beds from mice, it is necessary to drive stout planks about fifteen inches into the ground, leaving as much above the surface; a fine wire-net is then fastened across. In gardens the Siberian form has a distinctive name, but neither in habit nor in cone is there—as far as the fine series of trees at Kew enables one to judge—any difference between plants from that and other outlying regions and those raised from Swiss seed.

The Mountain Pine (*P. montana*) embraces a large series of slightly varying forms, differing widely in habit and general aspect according to the conditions under which it finds itself. It is a native of sub-alpine regions of central Europe, and is also found in the Pyrenees on both the Spanish and French sides. On rocky, bare ground this Pine lends itself to good purpose for the landscape-gardener. As a rule the species makes a dwarf, densely-branched, more or less procumbent, bush, but the form Uncinata has a tendency to make a neat pyramid. In the bottom of the *Cirque de Gavarnie*, in the Pyrenees, along the stream fed by the Cascade, I noted some years ago a number of trees of this variety, varying from three to ten feet or more, imitating in habit very markedly the Arole of Switzerland. The same habit is also to be seen in the Kew specimens of *P. uncinata*.

Certainly one of the most important of all the European Pines is *P. Pinaster* of the Mediterranean region. It is a handsome pyramidal tree, with light green leaves, from eight to twelve inches in length, and yellowish cones densely clustered around the base of the current year's shoots. Perhaps no other Pine has become more widely distributed over the earth's surface. It is very common in South Africa, and has become naturalized in many countries. The previously almost worthless Landes of western France have, by the agency of this tree, been totally changed; the continuous invasion of the sand dunes has been arrested, and almost the whole population of a considerable district kept employed in collecting the valuable, resinous products. The tree thrives well enough at Kew; and it is useful as a sea-side tree, as it will thrive in shifting sands. The timber, however, is of little value; it is soft and soon decays. *P. Pyrenaica* is a somewhat rare species, not interesting except from a botanical standpoint. A figure and full synonymy are given by Dr. Masters in the *Gardeners' Chronicle* for September 8th, 1888.

All the previous species belong to the group with two leaves in a sheath; the only European Pine which has five leaves to a sheath is *P. Peuce*, from Macedonia. This last-named tree is a handsome, symmetrical species, evidently allied to the Himalayan *P. excelsa*, but with shorter, differently-formed leaves, and almost sessile (not very long-stalked) cones. Both fruit freely enough at Kew, but *P. Peuce* has not been long enough in the country to allow of any statements being made as to its full size under cultivation. By some botanists it is regarded as a geographical form of *P. excelsa*, the nearest habitat of which is in Afghanistan, a distance of more than 2,200 miles from the Macedonian forests of *P. Peuce*.

Kew. *George Nicholson.*

New or Little Known Plants.

Portlandia pterosperma.*

AMONG the many novelties collected by Dr. Edward Palmer, during the last season, in the region about Guaymas upon the eastern side of the Gulf of California, is a Portlandia which promises to be a valuable acquisition if it can be secured for cultivation. This genus belongs to the *Rubiaceæ*, an order which supplies such ornamental shrubs as the Gardenias, Bouvardias, Rondeletias, etc., and received its name in honor of the Duchess of Portland, who in the last century was a friend and patron of Botany and made a fine collection of rare and valuable trees and shrubs for the adornment of her grounds at Bulstrode.

The first species described, *P. grandiflora*, is a native of Jamaica; was introduced into England in 1775, and was figured in the *Botanical Magazine* (*t.* 286) in 1795. It is there spoken of as a beautiful stove plant, not of difficult growth, and readily disposed to flower, blooming when not more than a foot high, its flowers uncommonly large, showy and fragrant. Seven other species have since been added, from the West Indies and Mexico, of which the *P. platantha* was also figured in the *Botanical Magazine* (*t.* 4534) in 1850. This is a similar shrub, with dark-green

* Portlandia pterosperma, Watson, *Proc. Amer. Acad.* xxiv. 52.

and glossy evergreen leaves, and very large funnel-shaped white flowers, "flowering in a very dwarf state and almost always in blossom."

The present species, as it is found growing in the deep cañons of the mountains about Guaymas, is a shrub or small tree, from two feet to ten feet in height. The foliage differs from that of other species in being rather thin and deciduous, instead of leathery and evergreen. The flowers are numerous upon the young, slender branches, a pair appearing at nearly every node. They are pure white and exceedingly fragrant, funnelform in shape, and nearly three inches in length. The triangular lobes of the limb are folded edge to edge in the bud so that it is strongly angled before opening.

Normally, as in most of the allied genera, the parts of the flower should be in fives, but most of the flowers in the specimens examined have them all in sixes, which may be a constant character of the species. In not a few of the related genera, however, the number of the corolla-lobes, stamens, etc., varies from five to six and sometimes to four, so that the variation in this case cannot be considered of any very special importance.

The plant fruits freely, and seeds were obtained, but these have failed to germinate. The surest and quickest mode of propagation would doubtless be by cuttings. The size, beauty and fragrance of the flowers, and the free-blooming habit of the plant make it very desirable as an addition to our green-houses, and it will probably prove to be hardy in the Gulf States or even farther north. *S. W.*

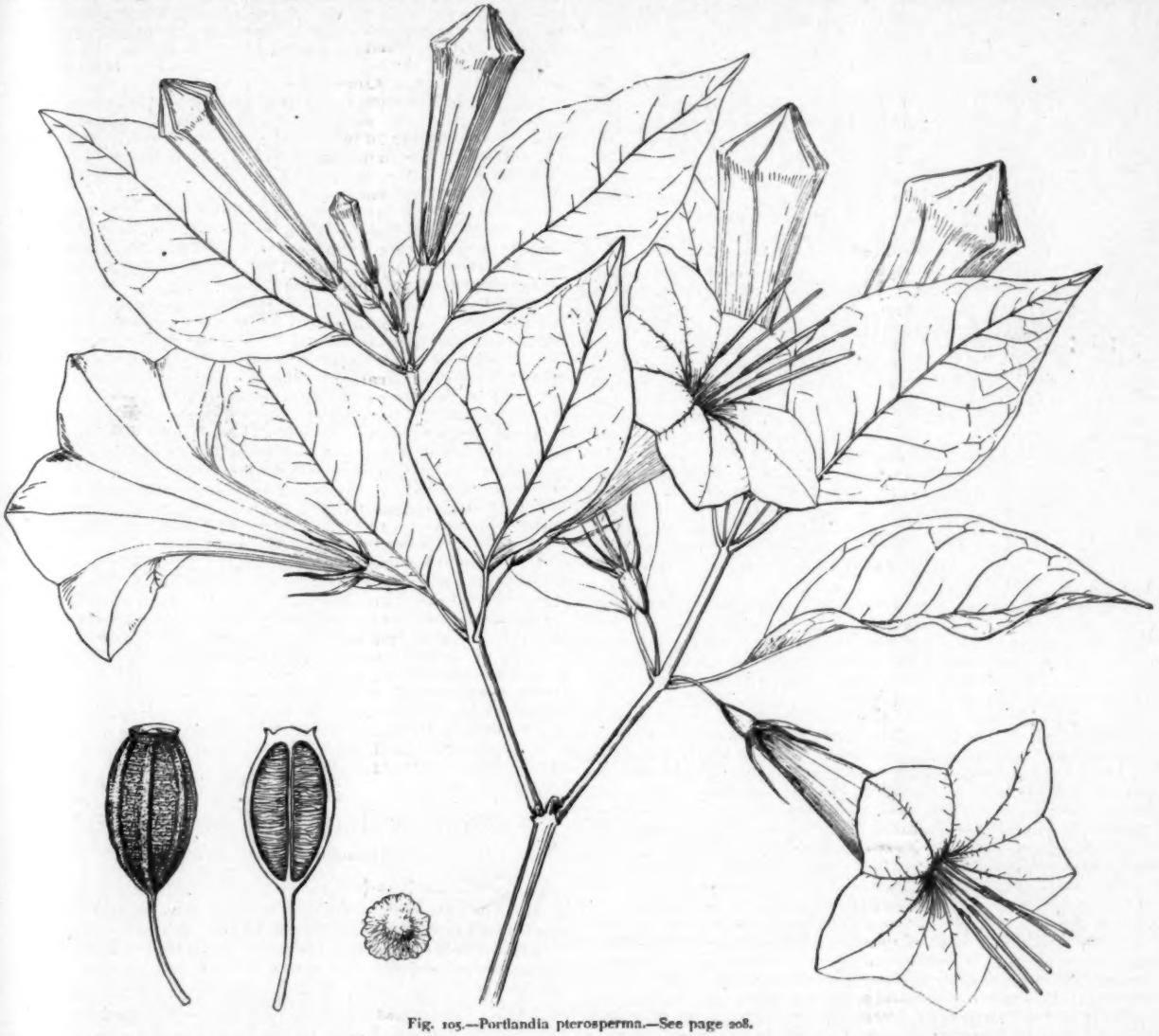

Fig. 105.—Portlandia pterosperma.—See page 208.

Cultural Department.

Notes on Primulas.

THE result of the special Primula Exhibition and Conference held in London in 1887 has been to bring under the notice of horticulturists generally a large number of pretty and interesting alpine species which previously were almost unknown, except to botanists. It also roused an interest in many of the commoner species and races, especially in the Polyanthus section and in the Auriculas. The origin of the last-named race has, since then, been the subject of several very interesting papers. Dr. Kerner, whose investigations on this point are based on personal observation, and who, therefore, is entitled to be heard with respect on the origin of the Auricula, has arrived at views something like the following:

About the year 1570 Clusius left Vienna to settle in Frankfort-on-the-Main; he began an active correspondence with noblemen and others upon botanical matters, and in this way was continually receiving living specimens from the Tyrol, Styria, Corinthia, Bavaria, etc.; a few years later he bewails his want of success in taming these alpine Primulas, especially the "Blanen Speik" (*P. glutinosa*), and the only two he really succeeded with were *P. Auricula* and *P. pubescens*. With this

latter plant Dr. Kerner experimented, and found it to be a hybrid between *P. Auricula* and *P. hirsuta*—exactly what one would expect to find on a study of the plant as we know it at the present time. About 1582 Clusius began to distribute these two plants to his friends, and in the year 1664 several forms of *P. pubescens* were known with different colored flowers, and these spread shortly after to England, Germany, Holland, etc. The true *P. Auricula*, as is well known, is not prolific in varieties, and as the other is known to succeed in almost any position, it was naturally much sought after until the varieties increased to something like a thousand or more. This *P. pubescens* will, no doubt, do very well for the origin of the alpine Auricula, but it does not account for the abundance of meal and the abnormally large bracts of the show kinds now in cultivation. We must look somewhere else for indications of this characteristic form, and *P. Palinuri* is the only species that is likely to help us. Just lately, however, another plant has been found wild in upper Styria, namely, *P. Göblii*. It was described by Kerner in 1875, and is said to be a hybrid between *P. Auricula* and *P. villosa*, which is very likely. Here we get meal in profusion, the large bracts and the dark-colored, pasty flowers of an inferior show Auricula. The perfection of the present times has been the result of selection to a large extent, and it will be many years before the investigations now proceeding will give us any real clue, and this only, on the one hand, by reversions and, on the other, by working with *P. pubescens*, about the parentage of which we are now quite certain.

To show what the conference has done for this genus one has only to glance at the number of species and varieties recently introduced, and the number of people interesting themselves in their cultivation. Hardly an English garden nowadays but is rich in Primulas of some kind, and not the least beautiful and interesting are the gold-laced Polyanthuses, which are once more coming into favor with us. Including species, hybrids and varieties there are, exclusive of Auriculas and the Polyanthus forms, no less than 150 different kinds of Primrose in cultivation. A few years ago it would have been hard to find a third of these in this country.

America has helped to swell the number, and few species introduced of late years equal the charming *P. Rusbyi* found by Greene on the summit of Mount Wrightson, and described in the *Bulletin Torrey Club*, viii, 122. *P. suffrutescens*, *P. Parryi*, *P. mistassinica*, *P. angustifolia* and *P. Cusickiana* are all in cultivation now, adding much to the beauty and interest of our rock-gardens and marsh-beds. The greatest number in flower at present are, of course, European species and hybrids, to which *P. Auricula*, in some way or other, has contributed largely. Amongst the most distinct are *P. Christii*, *P. venusta*, *P. Escheri*, *P. Kerneri*, *P. discolor*, *P. Alpina*, etc., some have the flower of one and some of the other parent, but all are worth including in a collection and are easily managed with ordinary care. *P. Balbisii* deserves special notice. It is somewhat like *P. Auricula*, but the leaves are smaller, rounder and less mealy, and the flowers deep-golden yellow. The Marginata varieties are now at their best; they add immensely to the interest of the rock garden and never fail to produce their flowers in the greatest profusion. It is characteristically called the silver-edged Primrose, from the margins being covered with meal, giving quite a character to the leaves. The plants have been likened to miniature, stunted, stone Pines, to which their long, bare stems have really a resemblance. The varieties are Grandiflora, Densiflora, Cœrulea, etc., varying in color from clear lilac to purple. They are quite hardy, and affect exposed rather than sheltered spots. *P. minima* is one of the little gems, but a most difficult plant to manage even when under full control in pots. It is found on the highest mountains of Switzerland, almost to the limits of perpetual snow, forming large sheets of rose and white flowers. It also has given rise to numerous hybrids, most of which are in cultivation, many far exceeding it in beauty, notably *P. Forsteri* and *P. Pseudo-Forsteri*, which produce larger flowers and usually bloom twice a year, namely, in spring and again in autumn. They both are more robust and easier to manage than the type. To this class also belong *P. glutinosa*, *P. Huteri*, *P. biflora*, and others of equal beauty. *P. Allionii* and *P. Ayrolensis* are two dwarf species with large, pretty, pink flowers, also quite hardy and amenable to ordinary treatment.

The Himalayas, give us a great wealth of beauty in this class of plants, amongst the most notable being: *P. Sikkinensis*, *P. Stuartii*, *P. purpurea*, *P. obtusifolia*, *P. Reidii*, *P. rosea*, *P. involucrata*, *P. prolifera*, *P. petiolaris* and others, varying in color from yellow to rose and purple and all perfectly hardy in our climate. *P. denticulata*, *P. erosa* and *P. capitata* are among the most beautiful of our spring flowers, the former especially, with its large, lilac balls, is very interesting. They stand our rough weather very well, continuing in flower for a considerable time. Some of these, however, like *P. Sikkimensis*, *P. capitata*, etc., are best treated as biennials, and, as they ripen seed freely, no difficulty will be experienced in keeping the stock up. The best of the Himalayan species have yet to be introduced, namely, *P. Elwesii*, *P. Gambelliana*, *P. Kingii*, etc. These are said to be the cream of Indian Primroses and although we have already had seeds we have failed to raise the plants. The most interesting discovery of recent years, however, has been made by Delavay in the mountains of Yun-nan, western China. He discovered no less than sixteen new species, and, although some few were closely allied to Himalayan types, they are distinct enough for specific rank, and will, undoubtedly, add much interest to this class of plants when they can be introduced to our gardens.

Kew, April 6th. *D. Dewar.*

The Muskmelon.

IN its delicious and refreshing qualities, the Muskmelon at its best is scarcely surpassed by any fruit of any clime. Though essentially a tropical fruit, its development is so rapid that it may be successfully grown in comparatively northern latitudes, provided the summer's sun shines for a few weeks with something like tropical intensity. But its foliage is injured by very slight frosts, and it cannot even endure the chilly winds of autumn if these are long continued.

The Muskmelon is emphatically a fruit for the home garden. It does not endure long transportation well, and its flavor deteriorates soon after being picked. Indeed, in quality it is quite capricious. If pickled a little before ripe, or if left a little too long before using, it is quite unpalatable, and sometimes even nauseous, and if the foliage of the plant is not in a healthy condition, the flavor of the fruit will usually be quite inferior.

A light, somewhat sandy, fertile soil, and a sunny exposure, sheltered from north winds, best suits this Melon. It may be grown well on a naturally heavy soil that is well drained, and that has been lightened somewhat by sand or coal ashes, and which contains abundance of humus from decayed barnyard manure. But it is useless to attempt Melon culture on a poorly-drained, clayey soil, without a favorable exposure. In the climate of the Northern States it is essential that the plants be started quite early, in order that the fruiting season may be prolonged as much as possible. As they cannot, however, endure the slightest frost in spring, it is well to plant the seeds on inverted sods in the cold frame the latter part of April. Cover the soil in the frame with sods, neatly fitted together, the grass side down. Then with a sharp lawn-edger or sod-cutter, cut these sods into pieces about four inches square, and on each of these place about five seeds. Now cover with about three-fourths of an inch of fine loam, and give a good watering. Keep the sash on, except on bright, warm days, watering as often as is needed. In about a month the plants will have formed their first rough leaves, and may be transplanted to the garden. If the weather is dry, give one very thorough watering at the time of transplanting. It is understood that the little pots are to be taken out of the frame and planted out without disturbing the roots of the plants more than is necessary. When the plants are started in this way, they are not apt to be troubled much by insects, but if the seed is planted in the open ground, the hills must be protected with boxes covered with mosquito netting.

The varieties of the Muskmelon are readily divisible into two classes, namely, the green-fleshed and orange-fleshed. The former have softer, sweeter and more juicy flesh, while the latter are firmer and more highly flavored. Each class has its advocates, but I think the latter are generally preferred. As a rule, the smaller the fruits produced by a variety the higher the quality, and when the seed of any variety is pure, its quality can be fairly judged by the color of the flesh and the size of the fruit, without much regard to the particular name the seedsman has seen fit to give it. And yet we cannot get along without the name. In my own experience, the Emerald Gem, Miller's Cream Nutmeg, Casaba, Surprise and Christiana rank very high in quality among the orange-fleshed Muskmelons. Among the green-fleshed, the New Orange Cream, Queen and Baltimore Nutmeg have proved very good. Livingston's Perfection, which I first tested last season, is a happy combination of the orange and green-fleshed Muskmelon, a union seldom met with. The rich, yellow flesh unites to a very considerable extent the juiciness and sweetness of the one class with the high flavor of the other, and in quality it is very difficult to surpass.

The finest Muskmelon I have ever tasted, quality alone considered, is the Algiers Cantaloupe of the French catalogues. The fruit is of large size, with flesh of remarkable thickness, very firm in texture and of surpassing flavor. Unfortunately it ripens so late that it is not certain of maturing in the Northern States. I am now experimenting with this variety as a parent for crossing with our best early sorts, from which I hope to be able to increase the firmness and thickness of the flesh, and to heighten its flavor.

The suggestions offered in relation to the culture of the Muskmelon apply as well to the Watermelon.

Experiment Station, Madison, Wis. *E. S. Goff.*

A Few Early Cucumbers.

CUCUMBERS are acceptable to most people, and those grown on the vines in the home garden have a special excellence of flavor. To obtain them earlier than can be done from seeds planted in the open ground, plant now in boxes containing about three inches of earth, lay six or eight seeds in a group three inches apart, over them sift enough fine dirt to cover one-half inch deep. I use soil from the hot-beds for this purpose. This being used continually from year to year, and mixed with the manure in the bed each year, becomes, in time, specially adapted to such work, being full of plant-food, and does not pack under repeated waterings, as ordinary soil will.

In the absence of such a source of supply, sand and loam, mixed, and having some chemical plant-food in it, will do. Set the box in a sunny window and when the seeds break ground, let the windows down from the top, or carry the box outside, in a sunny, warm, sheltered spot for a while each day. Return them early in the afternoon to the house. After they are well up transfer them to hills in the garden placing some protection over them. This can be done in the early part of May. I find a box eighteen inches square the best protection; this has a glass cover to be kept on in cool weather, and removed as the sun-heat is more or less strong. In this way a few hills, say ten or a dozen, can be brought forward in advance of the crop planted in the ground.

There is nothing that gives more satisfaction for an early cucumber than the White Spine, under some of its names. This is large enough, early, tender, and of good shape. For a later crop the Para is excellent; it is a profuse bearer and is fully equal to any of the cucumbers for the table, though it cannot be called early; neither can the Green Pickling. Cucumbers need manure under the plant in the hill and a rich soil besides to do their best.

The White Spine can be grown in a space of one yard for a hill, if cramped for room, leaving five plants in a hill. I put wood-ashes and bone-dust in the hill, mixed with the soil. A pint in each hill will hurry them on rapidly. In my locality the first of July is early for the first specimen grown with this treatment, and this is about two weeks ahead of planting in open ground. When sliced, kept in cold water for an hour, and dropped into sharp vinegar, they will not disturb the weakest digestion. A cucumber kept a while on ice is much better than one fresh from the vine. *W. H. Bull.*

West Springfield, Mass.

The Gardens of Levens Hall.—See page 206.

Orchid Notes.

Oncidium ampliatum majus was first discovered about fifty years ago in Costa Rica, and afterwards in other localities in Central America, where it enjoys a maximum temperature of about 85° Fahr. It is still often to be met with in collections, though not so frequently as formerly, owing to the introduction of larger-flowered and, according to some, prettier species. *Oncidium ampliatum majus* may, even in these days, be reckoned among the very finest representatives of

the genus. It is similar in character to the type, but has much larger flowers, and presents a finer appearance in every way. There are several fine specimens here which have been in flower for over a month, and they will last until the middle of May. There is no other Oncidium flowering at the present time which can compete with it in attractiveness, and this fact renders it particularly valuable for decoration and also for exhibition purposes at this time of the year. Before this Oncidium came in flower the Orchid-houses were made resplendent by the gorgeous-flowered *O. tigrinum*, a native of Mexico, and *O. splendidum*—which is, botanically speaking, only a fine variety of *O. tigrinum*, but which comes from Guatemala instead of Mexico, where it was first discovered about 1862. The subject of the present note possesses an advantage which can hardly fail to be appreciated by cultivators, namely, that of being easily managed. Large plants generally do well when grown in either pans or baskets, which must, however, be well drained with clean crocks. A compost of good, fibrous loam with a little sphagnum mixed is most suitable for it. Most Orchids like plenty of water during the growing season, but this is an exception. This distinction is due to the large pseudo-bulbs which are well provided with moisture absorbed by the roots from the atmosphere. At no time should much water be given, except in very hot weather, when evaporation goes on rapidly, and then more than usual may be given with advantage. This species, having large, leathery, dark green leaves—like some Cattleyas or Lælias, but much handsomer—will bear a greater amount of sun-heat than could, with safety, be allowed to thinner-leaved kinds. Small plants should be grown in baskets or pans and suspended near the roof, so as to obtain as much light as possible.

In general appearance this is a very handsome Oncidium. Its large, ovoid, compressed bulbs are of a bright green when young, and heavily spotted and blotched with purple. As they become older the skin becomes shrivelled and blackish-purple. The leaves are large and very beautiful—indeed, they form one of the chief beauties of the plant, with their dark-green, glossy surfaces. From the base of the pseudo-bulbs, a panicle of bright golden flowers arises for a length of eighteen inches or more. One plant now in flower here has six such panicles, each bearing from forty to fifty large flowers, which present a solid yellow mass, the monotony of which is most agreeably broken by means of the numerous reddish-brown spots and blotches on the sepals and the base of the petals, as well as on the crest of the lip. The under surface of the flowers—especially the lip—is covered with a peculiar white bloom, which is quite characteristic. Sprays of flowers will remain in good condition for a long time in a room, if placed in fresh water. The base of the stem should be occasionally cut, so as to let fresh cells absorb the water.

St. Albans, England, March 30th, 1889. *J. Weathers.*

Cattleya Lawrenceana.—A splendid example of this lovely Cattleya now forms a very conspicuous object in the collection of Mr. Hicks Arnold, of New York. Though a comparative small plant with but thirteen bulbs, three of these have borne, in the aggregate, eighteen rich and very striking rosy-purple blossoms, and on one spike alone nine flowers were counted. Its appearance at this season will make it a great favorite with all lovers of this gorgeous family; but it is to be regretted that such a fine Cattleya is not more plentiful. But as it comes from the Roraima Mountains, in British Guiana, and can only be collected at the cost of great hardship, it will probably remain a rarity for some time. In habit *C. Lawrenceana* is most distinct, having pseudo-bulbs of a reddish hue and foliage of a stout and very leathery texture. In its native home it has been seen with eleven flowers on one spike, and we hope this number will be soon attained on cultivated plants. They enjoy a few degrees warmer temperature than most of this genus, and the atmosphere should be kept charged with moisture while they are growing. Baskets have been found preferable for this species, and if suspended in a position close to the light, in a mixture of fibrous peat with a little sphagnum, it will produce its handsome blossoms freely. Among other noteworthy plants seen in this collection was the curious green and black flowered *Cœlogyne pandurata*, a beautiful specimen carrying a spike with a dozen flowers; a *Cypripedium grande*, remarkable for its vigorous growth and striking blooms; an *Oncidium Marshallianum* with a many-flowered panicle of bright yellow and rich brown blossoms, and an *Odontoglossum citrosmum album* bearing a dense cluster of large, pure white flowers. The Cypripediums in this collection are growing very rapidly, and a fine show of them is shortly expected

Summit, N. J. *A. Dimmock.*

Rose "Souvenir de Wootton."—This is a hybrid Tea Rose, and was named after the country-seat of Geo. W. Childs, Esq., at Bryn Mawr, Pennsylvania. It is a seedling from the well-known Tea Rose, Bon Silene, fertilized by the hybrid Rose, Louis Van Houtte. It was raised by John Cook, of Baltimore, and was sent out in the spring of 1888, but its merits as a winter-blooming rose were but little known until this season, when it has proved to be a very free and continuous bloomer and of rank, vigorous growth. The color is crimson, flushed with carmine, and the blooms are very large, frequently measuring six inches across. The petals are short, which gives it a somewhat flat appearance; but, while it lacks something in gracefulness, it is a very showy rose and of exquisite fragrance. The foliage is large and beautiful. It will doubtless prove to be a very useful and popular winter-flowering rose. Of its qualities as an out-door bedding variety very little is known; the coming summer will afford opportunity to test it.

Philadelphia. *Robt. Craig.*

This latest American addition to the hybrid Teas seems to be a Rose of much promise, combining the colors of both parents in a very pleasing shade, somewhat similar to that of Papa Gontier. As exhibited at the recent show of the Pennsylvania Horticultural Society in Philadelphia, the flowers were of fair size and substance, and in form somewhat like "American Beauty," though apparently not quite so double. The color appears to good advantage under artificial light, and this will help it to win a place in popular favor. The foliage of Wootton is large, handsome and of good texture, and, what is very important to the grower, is said to be proof against the attacks of "black spot." The plant is of vigorous habit, and also very floriferous, and it is expected by the introducer to prove so valuable an acquisition as to displace American Beauty in popularity. Of course, a more extended trial will be necessary to justify these hopes, though many prominent growers have already expressed favorable opinions in regard to this Rose; and, for the credit of a variety of distinctly American origin, it is to be hoped that their confidence may not be misplaced.

Holmesburg, Pa. *W. H. Taplin.*

The Spring-Garden.

THE man who plants a spring-garden, even in this New England climate, where the springs are proverbially and almost unexceptionally cold, uncertain and unsatisfactory, provides a richer store of pleasure for himself and his friends than can be obtained from a garden of any other sort. There is no delight to be derived from flowers which equals that which the earliest harbingers of spring afford when they open amidst melting snows, after a long, cold, northern winter. The humblest Crocus or Squill or Snow-drop is more and means more than all the splendors which the suns of summer call into existence. The person who has not a spring-garden, or who does not cultivate at least a few of the hardy plants which flower in the very early spring, knows but little yet of the true pleasures of gardening. These thoughts come to me year after year. Every year the pleasure is keener, as every year the familiar faces of these humble flowers rise up to remind us that the long winter has ended. As I write the earliest flowers have already passed away—the Snow-drops, the dwarf, reticulated Iris and the early Crocuses. But many more plants are already in flower, and the long procession which may be made to grace our northern gardens has hardly commenced to move yet. The most beautiful flower by far just now is that humble plant which the great Swiss botanist, Boissier, brought back from the western Tmolus, in Asia Minor, and dedicated to the companion of many of his journeys, the *Chionodoxa Luciliæ*. The generic name derived from Greek words, meaning the glory of the snow, indicates its vernal habits. It is, perhaps, the most beautiful plant of its class of recent introduction, with its compact habit and short racemes of large, intensely blue flowers shaded into white towards the centre. This charming plant is perfectly hardy and in habit it resembles some of the early Squills. These, too, are at their best, and whether they are planted in beds or as edgings in the grass, they are always among the brightest and most attractive of the hardy, spring flowers. Their small size adapts them for planting singly among the crevices of the rockery, and when they are freely used in this way the effect which they produce is excellent.

The spring Snowflake (*Leucoium vernum*) is also at its best just now, and its nodding white bells, handsomely marked with green at the ends of the perianth-segments, are among the most attractive features of the spring-garden. But this plant, although a native of central Europe, is not entirely hardy here, or rather, perhaps, the bulbs do not last many years, so

that unless new plantations are made they gradually disappear. But the plant well repays the trouble and expense of occasional renewal. Some of the early varieties of the single Daffodil (*Narcissus Pseudo-Narcissus*) are already out, in the warmest pockets of the rockery, and show what the family will do after another week or two of warmer suns. The lovely Bloodroot (*Sanguinaria*) has sent up its one-flowered scapes, and the white star-shaped flowers are just opening in advance of the large heart-shaped and deeply-lobed leaves, which make a fine show all summer long. This is one of the most satisfactory of all our native flowers to bring into the garden. The round-leaved Violet (*Viola rotundifolia*) has just opened its yellow flowers here for the first time. It is a rare northern plant, with stem-leaves of the shape indicated by its name, an interesting species to botanists, and one which, should it take kindly to captivity, will prove a good addition to garden plants. The various Hepaticas, double blue, double purple and double white, are in full bloom, as are the less showy, but not less attractive, single varieties. The Hepatica lends itself to doubling better than most flowers, and some of the intensely double, deep-colored sorts are among the most beautiful objects imaginable in the rock-garden in April.

A few early-blooming shrubs harmonize just now with these humbler plants. The most conspicuous of these is the evergreen Japanese Andromeda (*A. Japonica*), near relative of our Allegheny *A. floribunda*, but of looser habit, with broader and looser panicles of handsome white flowers. These are rarely seen to advantage in this climate, as they appear before the cold weather is over, and so are generally destroyed just as they are opening. This year the exceptionally mild winter has favored them, and they are just now in great beauty. Much better, too, this year, than I remember it here is *Daphne mezereum* its leafless branches being completely smothered with its fragrant rose-colored flowers. It is an excellent hardy shrub, of neat and compact habit. The flowers are always abundant and always early, and they are succeeded by handsome scarlet berries. The Cornelian Cherry, the *Cornus mascula* of Europe, is at its best, too, covered with sheets of golden bloom. It is an admirable hardy shrub or shrub-like tree not too often seen in this country, although it should find a place wherever spring flowers are valued. It never fails to bloom profusely, and is beautiful, too, later in the season, when its ample foliage appears, and when its branches are covered with the scarlet, cherry-like fruit.

Boston, April 18th. C.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XVIII.—Germination.

THE sprouting of the seed is a special example of growth under favorable conditions. The supply of building materials is of precisely the right kind and of sufficient amount to insure rapid development. Under the head of "Growth" the principal facts have been already considered by us, so that we can now confine ourselves to those features which are peculiar to the seed itself.

The food in the seed, whether it exists as oil or as starch, is in a form adapted to preservation. Hence this food remains of good quality long after the vitality of the germ may have been lost.

The conversion of this solid food into forms which can be utilized by the germ, is effected by one or more of the nitrogenous, inorganic ferments, which we have already examined briefly in a preceding paper. The most important part is played by that which is known as diastase, an enzyme or ferment, which changes starch into a substance which readily goes over into the form of sugar. In oily seeds there is apparently a complete change in a good portion of the oil, by which starch is produced, and this is then consumed as the food of the germ. In the newer parts of such seeds, and in the paths of transfer, starch can usually be detected by appropriate tests without any difficulty.

In all these changes during germination, there is an absorption of water. Without enough water to insure perfect solubility of the solid food, the process of germination goes on only slowly and irregularly. But in point of fact, the amount of water furnished to a seed must (except in the case of aquatics) be so given to it as not to exclude free access of air; that is, the oxygen of the air must have free access to the soaked seed. But, even with these absolutely necessary conditions, the seed will fail to germinate unless another is afforded—namely, a certain temperature. This is very different for different seeds, as might be expected from what we have already seen as regards growth in general. A few sorts will begin to sprout at the temperature of thawing ice, but for all of our ordinary plants in general cultivation (except certain members of the Cress family) the temperature must be not far from 60° to 90° Fahrenheit.

The three conditions are, therefore, water, oxygen and warmth. Can we hasten germination by modifying the favorable conditions in any way—that is, by making them more favorable? Various chemical agents have been employed for this purpose, notably those which can yield to the seeds oxygen in its active form, as ozone, but the experiments have not been practically successful.

Attention should be called to the interesting fact that some seeds appear to take their own time for beginning to sprout. While many seeds germinate speedily, and whenever favorable conditions are present, there are many which do not start until definite periods of rest have elapsed. The seeds of many of our forest-trees are of this sort, and in their case it is not difficult to see that the refusal to start at once, even when all the necessary conditions are afforded, has something to do with the protection of the plantlet against beginning its development at an unpropitious season. It is, in short, a conservative faculty.

Whether light affects germination to any appreciable extent is a question which has been attacked in an experimental manner, but as yet with inconclusive results. There are some seeds whose sprouting appears to be plainly hindered by exposure to bright light, while there are many others which are as plainly indifferent. Much can be learned by an attentive examination of the manner in which seeds are self-sown in nature. Some seeds are scattered by nature on the surface of good soil, and there remain uncovered. Here, on the very surface, they will germinate freely and produce good plants. The practical side of this and allied questions is presented in a trustworthy manner by a competent authority* on the raising of plants from seed in a paper wherein directions are plainly given for treating seeds from the period of their ripening to the time of sowing, and the proper conditions are insisted upon in a clear manner. In that interesting paper the directions follow almost exactly the teachings of nature, so far, at least, as it would seem possible they could be adapted to the exigencies of tree-planting on a large scale.

When the germ develops, there is speedily seen a definite assumption of form and direction of parts; the stem rights itself, and the root descends in search of moisture and mineral matters. At this earliest period of growth the seedling requires great care at the hand of the cultivator. Proper conditions of light must be afforded, in order that the work of assimilation may be adequate to the needs of the young plant; but, on the other hand, care must be taken to avoid exposure to too intense a light under artificial conditions. Other conditions, such as temperature, moisture, require the greatest attention.

The practical solution of these difficult questions must be sought in horticultural and arboricultural treatises, but the underlying principles of successful practice are to be found in the accepted statements of modern physiological botany.

There are also certain other practical difficulties which follow the cultivator from the moment he places the seed in the soil. The plants under his care are liable to fall a prey to disease. The study of plant-diseases belongs to what is termed vegetable pathology, a subject which can be alluded to here only in the most general terms. We refer to the matter only that our examinations of the functions of healthy plants may be supplemented by a glance at the same functions when they are disturbed by disease. Many of these diseases are caused by the invasion of other organisms, which may be collectively termed fungi (including under that term all the so-called microbes or bacteria in the widest sense). The discussion in this journal of these invasions as applied to special cases has been entrusted to one who has made very extensive contributions to many parts of the field, and therefore only the briefest general statement is necessary at present.

With respect to attacks of fungi on ripening and germinating seeds, it is merely requisite to say at this point that these fungal organisms are unable to exist unless they find food which has been prepared by other organisms. They can take this prepared food, even from the very tissues of the organisms which they attack, destroying not merely the supply of nutriment, but the organisms themselves. Reserving for the next paper a fuller treatment of this subject, we may turn for a moment to a consideration of a single question, namely, as to whether it is possible to kill the fungi which invade seeds, without killing the germs of the seeds. Attempts have been

*The Propagation of Trees and Shrubs from Seed. By Jackson Dawson, of the Arnold Arboretum of Harvard University.

made to destroy such fungi by subjecting the dry seeds to high temperatures, and to the action of strong solutions of poisons. Among the many liquids which have been employed with partial success in a few cases may be mentioned solutions of blue vitriol or sulphate of copper.

Cambridge, Mass. *George Lincoln Goodale.*

Correspondence.

Our Forestry Exhibit at Paris.

To the Editor of Garden and Forest:

Sir.—Some account of the Forestry Exhibit lately sent to the Paris Exposition by the Forestry Division of the Department of Agriculture may be of interest to your readers.

It is the first ever prepared in this country for such a purpose, in so far as it is confined to forestry as an art, and leaves out the display of manufactures which depend on forest-products. The main object in view in preparing this exhibit has been to be instructive to European students of American forest-conditions, forest-growth, forest-products and forest-utilization, and many novel features in the method of arrangement of the exhibit have been introduced to attain this object.

To give an idea of the forest-areas still existing a large wall-map, twelve by seventeen feet, has been prepared, showing for each state the ratio of forest-land to total area by different shades of green color. This is all the knowledge we can really claim to have in regard to our forest area, since the statistics gathered by the census are no longer true, and a stamp in the shape of a tree has been used to indicate on the map the localities of densest growth.

Great care has been bestowed on the forest botanical exhibit. Out of the 420 or 430 arborescent species forming our forest-wealth, 120 species have been selected which appear to form more or less the important staples of our timber supply, or which for some special reason seem desirable objects for our future forestry. The wood specimens are about nine inches in height and two inches in breadth, representing a cut from centre to periphery of varying width, with a slanting cut at the top of centre, and showing the bark, the upper third oiled and varnished, the lower dressed in the raw. The woods that belong to the same genus, or to several genera closely connected, are mounted together on one panel, and the panel is surrounded by glass-covered boxes containing specimens of branch and fruit of the species contained in the group. By the side of each block of wood is a label showing the botanical name of the species with English and French equivalent, a small map showing its field of distribution, and below it the description of the tree and its wood as given in Professor Sargent's account of the Jessup collection of woods.

There are thirteen such groups or panels. The Pines are represented by twenty-two species—fifty-four northern, six southern, eleven Rocky Mountain and Pacific species. The other conifers fill two panels with twenty-four numbers. The ten most important Oaks fill another panel, and Hickory, with Walnut, Chestnut, Beach and Hornbeam, another.

The Massachusetts Society for the Promotion of Agriculture, which is the trustee of a fund bequeathed by the younger Michaux, a French botanist, for the purpose of encouraging the study of trees in the United States, placed one hundred dollars at the disposal of Mr. Fernow for the purpose of acknowledging by an exhibit their recognition of the generosity of this man. A most fitting exhibit seemed to be the work of this botanist in 240 colored plates illustrating the American forest-flora, grouped twelve in a swinging frame, headed by a steel engraving of Michaux and a French inscription relating the circumstance of the appearance of this exhibit.

Professor Rothrock, lecturer under the Michaux fund, of which one-half was contributed by the American Philosophical Society, obtained permission to loan for photographic enlargement, some of the many fine lantern slides of characteristic tree-growth which he has collected. These were supplemented by photographs from Mr. Henry Brooks, of Boston, and from other sources. Especially noteworthy are the contributions of Mr. Taber, of San Francisco. His California trees, on plates fourteen by twenty inches, are magnificent representations. Altogether some fifty characteristic photographs are in this collection.

A frame of veneer sections shows the gross anatomy of some of our important woods, and a series of magnificent photo-micrographs in swinging frames, executed by Mr. Thomas W. Smillie, photographer of the National Museum, from sections of Mr. Z. L. Zabriskie, illustrates the anatomical structure of twenty species enlarged 100 times in radial, tangential and transverse section. This is a kind of exhibit probably never before presented to the public, and highly interesting.

The sub-section of Forest-culture contains first, a collection of tree seeds of 100 species in glass bottles. These will convey to the European forester, who is accustomed to handle not more than twenty species, an idea of the variety and also the difficulty in the selection, proper identification and handling of our wealth of valuable trees and their products.

The second number is the model of a tree-planting machine invented by Thomas A. Stratton and lately patented, although it has been tested for two years in western Nebraska. The machine is drawn by five horses, or by a locomotive, and is capable, in one motion, of plowing the ground and planting from 20,000 to 30,000 seedlings in a day. One man to drive and one man to feed have set 15,272 Ash seedlings in nine hours.

The third number represents a collection of sections of fifty trees, planted and grown in different localities of the country, five sections from each tree—a small forest reduced to shipping dimensions. The sections came from the Arnold Arboretum, of Massachusetts, the Agricultural Colleges of Michigan and Illinois and the well-known Farlington Plantation, in Kansas. The sections were taken from the base and every three feet of each tree up to twelve feet, and mounted in frames, so that the five sections in the frame represent a twelve-foot pole, showing on their face the rate of growth in the different parts of the tree. The annual rings are marked with the year of their growth, and a centimeter measure is pasted across the face of each section for ready reference. The amount of information which may be readily read from these living books on tree-growth is remarkable, and would fill many pages.

In the section of Forest-utilization attention is first claimed by the huge slab of Redwood, framed in a frame seven by twelve feet. A series of photographic views, in a Redwood frame, shows the different stages in lumbering these giant trees. A collection of the tools used in lumbering, arranged as a frame surrounding photographic methods of lumbering as practiced in the northwest and in the south, will give to the Europeans an idea of the art of lumbering, which is truly and specifically an American development. The model of a lumbering sleigh, and of a steam logger, which makes its own ice-road, getting into every corner of the woods, completes this phase of our working of the forest.

Numerous large-sized slabs of our economically important woods show the result of the lumbering; especially a fine plank of the White Pine, a monster plank of Cypress, a slab of the Tulip Poplar six feet wide, Black Walnut, Birch, Cherry, Oak, and panels of curled woods of the southern Pines, Maples, etc., give some idea of our wood material.

It is unfortunate that Mr. Fernow had so little time and such a scanty supply of money at his disposal. But when it is considered that the collection had to be made in four months and for $600, and that it is to be displayed in the limited space of sixteen by twenty-two feet, it will be admitted that the collection is remarkably well fitted for to give instruction to the European forester.

New York. *E. T. Lander.*

The Home of Shortia.

To the Editor of Garden and Forest:

Sir.—I lately made a collecting trip to the region of Shortia, and found the route from Highlands, North Carolina, an interesting one. It passes through quite extensive thickets of *Rhododendron Vaseyi*, easily distinguished, even at this early season (March 25th) by their very large flower-buds, with black-tipped scales. A fine group of Carolina Hemlocks was also passed. We camped the first night at the White Water Falls, which alone are worth a considerable journey to see. The Jocassee Valley, our destination, is at the mouth of White Water Creek, or rather at the junction of White Water and Devil Fork. I wished to see if Shortia was growing as high up in the mountains as these Falls, which are at least 1,000 feet above Jocassee. No Shortia was found, however, until we reached the valley, which has an altitude of about 1,200 feet, and here it grows by the acre. Every little brooklet is lined with it. Most of these little water-courses are in deep, narrow gorges, where the sun hardly penetrates, except during the middle of the day. All of these steep banks are literally covered with Shortia. What is comforting to the botanist is that it can hardly be exterminated. It is on land too steep to be cultivated, and there in such abundance that no amount of collecting can ever affect it very seriously. Our party took away bushels of it, and no one could tell that a plant had been disturbed, so thickly is it growing. No idea of the beauty of

this plant can be formed until it has been seen in its native home. The mass of glossy green and white once seen can never be forgotten.

The home of Shortia is a strange mixture of north and south. As a rule it grows under the shade of tall Kalmias and Rhododendrons. Hemlock Spruce and White Pine, of splendid dimensions, are very common, while just a few rods distant grows *Pinus mitis*, *Pinus pungens* and *Pinus rigida*. The old cotton stalks in neighboring fields show that the valley is warm enough for so tender a plant.

I found *Stuartia pentagyna* quite common, and recognized it by the remains of last year's fruit, which were still clinging to it.

Vaccinium arboreum is common in the valley; some plants, true to their name, being quite little trees. In some specimens the leaves were still persistent and quite green.

The list of plants found in flower is not large. Of course, *Epigæa repens* was in full bloom. In one place *Polygala paucifolia* showed its bright purple blossoms, contrasting beautifully with the white ones of Shortia. *Trillium sessile* is common, but was hardly open. *Stellaria pubera* was very common and well out, and so were *Tiarella cordifolia*, *Saxifraga leucanthemifolia*, and several species of Viola, including *V. rotundifolia* and *V. pedata*. On the Pine ridges we found *Chrysogonum Virginianum* and *Erigeron bellidifolium*, and the Amelanchier was covered with bloom. One of the prettiest things was *Smilax laurifolia*, which is common here, its mass of glossy evergreen leaves and abundant dark fruit making it very ornamental. I wondered if it had ever been cultivated.

Jocassee has been settled many years, and contains some good farms. There are no hotels nor stores, and the visitor must either go prepared to camp out or find quarters at farm houses. The nearest railroad station is Seneca, South Carolina, distant about twenty-five miles. There are good roads to Seneca, also fair mountain roads between Highlands and Jocassee. To see Shortia in blossom and in its glory one must get there about the 20th of March, usually, not later than March 25th.

After leaving Jocassee we crossed over into Georgia, hoping to find Shortia on the Chatuga River and its branches, but were disappointed. It seems to be confined to the one locality, the head waters of Keowee.

Highlands, N. C. *Frank E. Boynton.*

The Newtown Pippin.

To the Editor of GARDEN AND FOREST:

Sir.—I had just eaten a Newtown Pippin when I sat down to read GARDEN AND FOREST, in which you quote a writer in the *Saturday Review* who says:

"We cannot admit that the very best American apple ever possesses a tithe of the flavor of good English fruit."

A man writes confidently about what he knows, and here I find many people judge a fruit more by its appearance than its flavor; but let at least one who puts flavor first say that an American Newtown Pippin is the best apple in the world.

If your people can only grow enough of it, and grow it well, the rest of the world will have to be very active, indeed, to beat you in apples. They have first to raise a kind to equal it. We have good apples here, and there are good apples in France (though not quite equal to ours, I think). But there is nothing with the splendid high flavor and lasting quality of the Newtown Pippin. I am writing this on the 6th of March, and there are Newtown Pippins here in London, still, after their long voyage and long keeping, of high quality. Our own eating apples have disappeared long ago. There may be a few, often flavorless, in private collections, but in Covent Garden one sees nothing of them. I often wonder when reading your excellent rural journals that I do not find anything about the Newtown, and, so far as I have been able to judge, Americans generally do not value it fairly. They tell me they have better apples, but better would be too good for this poor world.

Garden Office, London. *W. Robinson.*

A Nursery of Hardy Perennial Plants.

To the Editor of GARDEN AND FOREST:

Sir.—Even at this early season a visit to the nurseries built up and conducted for many years near Passaic, New Jersey, by Woolson & Co., and now in charge of H. Meyers, is instructive as well as interesting. Many of the Christmas Roses are still in bloom. Some of the rarer Tulips are now open, and near them are at least fifty varieties of the choice hybrid Narcissus. Under the trees are colonies of Dog-tooth Violets, *Erythronium albidum* and *E. Americanum*, with Trilliums, Hepaticas, English Primroses and Cowslips in great masses on every side; while if rarer flowers are sought, one can find the wonderfully deep blue of *Gentiana excisa*, which appears a little earlier than the better known *G. acaulis*, the almost equally intense blue of *Lithospermum prostratum*, or the rich yellow of *Potentilla Pyrenaica*. Another plant to be seen now, not new, but rare in gardens, is *Isopyrum biternatum*, which resembles its relative, *Thalictrum anemonoides*, in foliage, while the smaller pinkish-white flowers are much more abundant. Among the early Phloxes in bloom are *P. bifida*, from the cliffs of the Missouri River, and Douglas' Phlox, from the Cascade Mountains. But I did not set out to make a catalogue of the plants in flower. The collection numbers more than 2,000 species and varieties of hardy, herbaceous plants, and among them are most of the meritorious plants of this class which are now known to succeed well in cultivation. The spring-garden has not been overlooked in making this selection, and the display of bloom in April and May is always attractive.

What I do wish to say is, that this establishment illustrates in a striking way the growth of the interest in hardy perennials as garden-plants in this country. Many years ago a catalogue of hardy perennials was added to their nursery list, by Hoopes Brothers & Thomas, but here was established the first nursery in the country devoted to these plants alone. Mr. Woolson was for many years engaged with Dr. Thurber on *The American Agriculturist*, and both of them took delight in examining and identifying the specimens sent to the office from all parts of the country, and by a system of exchanges they gathered in time a considerable collection. At last the exchanges reached such proportions that two small green-houses were erected to help propagate the plants demanded, and in 1878 the sale of plants began, and the first catalogue was issued. This catalogue, like those which have followed, had the benefit of Dr. Thurber's revision, and they have been distinguished for botanical accuracy as well as for neatness, compactness and instructive comment. From this modest beginning the business has grown, as the taste for hardy flowers has become more general, until now landscape-gardeners and others, having large places to provide for, send orders here for plants by the thousand. But this is no longer the only place where hardy perennial plants are grown in quantity. Other nurserymen have felt the need of adding a department of this kind to their business, so that it will hardly be denied that the development of this demand for hardy plants is one of the most striking incidents in the current history of ornamental gardening in this country.

The soil and exposure of this place is admirably adapted to the class of plants grown. From a plateau of light, sandy loam the ground slopes gradually to a low, marshy hollow, in which aquatic plants will flourish. Beyond this rises a wooded slope, in which have been naturalized many shy or shade-loving plants like Trailing Arbutus, Pyxidanthera and Twin-flower. Almost any variety of soil—sand, clay or peat—can be found somewhere on the eight acres now devoted to the business, and almost any plant that will live in this climate can be made at home here. It is safe to say that a great proportion of the hardy perennials which have been introduced to American planters during the last ten years have been put on the market through the medium of this house. Among these, besides many foreign plants, have been a large number of native plants which are sufficiently showy or interesting to commend themselves to planters. Indeed, some of our native plants which but a few years ago were rarely seen in cultivation are now propagated here in large quantities. Of the lance-leaved Coreopsis, for instance, and the Missouri Evening Primrose the sales were last year as large as of any other plants. Many American plants, however, can be gathered wild more cheaply than they can be grown, which is the case with the Dog-tooth Violets, the Cypripediums and, indeed, all the native Orchids and Ferns, and collectors send such plants here from all parts of the country.

There are many native plants well worth a place in gardens which have never yet been introduced. No doubt numbers of the alpine and sub-alpine plants of the Rocky Mountains of Colorado and of the Blue Mountains of Oregon, for example, which are likely to prove hardy, will be interesting additions to our rock-gardens. The growing desire for such plants will stimulate the zeal of collectors, and it is gratifying to know that the material needed for all soils and situations is increasing every year. Certain it is that of herbaceous perennials, of perennials partly woody, of low shrubs and woody climbers, the available selection in this country is much richer than it was when Dr. Thurber and Mr. Woolson began to make a specialty of these plants.

Passaic, N. J. *S.*

Notes.

The great gold medal of the Royal Horticultural Society was recently bestowed upon Baron Ferdinand von Müller in recognition of his services in the investigation of the flora of Australia.

Mr. E. W. Reasoner states, in the *Florida Dispatch*, that *Exochorda grandiflora* does remarkably well in that State, as does *Spiræa Cantoniensis* and some other Spiræas which are not quite hardy in the Middle States.

A correspondent of *The Garden* (London) recently spoke of a spot in Dunrobin Castle Gardens, Scotland, where, about the first of March, two acres of the common Snow-drop could be seen in full bloom under the ancient trees.

Our readers will remember that the first issue of Garden and Forest contained a photographic picture of the new Chrysanthemum, Mrs. Alpheus Hardy. The first illustration that we have seen of it in a foreign journal appears in *The Garden* for April 6th, a fine wood-cut of a single flower.

Mr. Baker describes in a recent issue of the *Gardeners' Chronicle* a new species of Snowdrop, *Galanthus Fosteri*, brought from the neighborhood of Amasia, in Asia Minor. "So far as the flowers go," Mr. Baker remarks, "it looks most like the larger forms of *G. Elwesii*, but the leaves are broad and bright green, like those of *G. latifolius*."

Le Moniteur d'Horticulture reproduces from *Hygiène Pratique* this simple method of testing the quality of a pear: Write a name with pen and ink upon the dry skin of the fruit. If the ink is quickly absorbed, leaving clear, sharp lines, the quality of the fruit is good; if the skin does not absorb the ink quickly, and the lines are blotted, the quality is inferior.

Mr. D. Dewar, whose interesting notes on Primulas appear on another page of this issue, is now in charge of the herbaceous and alpine plant department at Kew. It will be remembered that the list of cultivated Primulas, which formed the most important part of the printed report of the Primula Conference, held by the Royal Horticultural Society in 1887, was prepared by Mr. Dewar.

Mr. John N. Gerard, of Elizabeth, New Jersey, sends us a blooming plant of *Androsace coronopifolia*, a hardy Russian biennial, its small white flowers, with a yellow centre, borne on slender scapes. A colony of this little plant is an attractive feature in the rockery or on the margin of the herbaceous border. It will come up from seed year after year if it finds itself in a congenial position, so that there are new plants to bloom every spring.

A healthy, well-flowered example of *Shortia galacifolia* was shown by Mr. H. J. Elwes at a recent exhibition of the Royal Horticultural Society, and, as a matter of course, was awarded a first-class certificate. An English correspondent writes that "The interesting account of this plant which appeared in Garden and Forest in December last has called the attention of English growers of alpines to it, and consequently living plants of it are already in several collections here. It does not appear to have ever been in English gardens until now, and Mr. Elwes' plant is the first flowering example of it ever seen alive in Europe.

We have heard with much pain of the untimely death of Mr. J. A. McKenzie, who was associated with Messrs. David Yates & Co., of Philadelphia, in charge of the department of landscape-gardening in their business. Mr. McKenzie was the eldest son of Major Alexander McKenzie, the eminent landscape-gardener, of England, and during his brief sojourn of a single year in this country he gained a wide reputation for ability in his profession, and made a friend of everyone he met by his modest and manly bearing. Of an article from his pen which appeared in a recent number of *Building* we shall take occasion to speak hereafter.

Hideous floral designs are produced in every country, but only in our own, perhaps, could one be created which should reveal so grotesque an attempt at humor with so utter a disregard for the claims of art on the one hand and of proper reverence for death on the other. It was designed, according to the *American Florist*, for the funeral of a railroad employee and represented a limited coupon ticket. The ticket, which was five or six feet in length, rested against a column on which was placed a ticket-stamp, and behind stood the Angel of Death in the act of stamping in the date of limit. The coupons bore the names of the different roads upon which the dead man had been employed, with corresponding dates, and at the top were the words "Limited to October 9th, 1888"—the day of his demise.

At the Massachusetts Agricultural College Experiment Station pollen was taken from a Carnation flower of a magenta color, and after being kept in a dry place for five days, was applied to the stigmatic surfaces of a yellow flower. From twenty-seven seeds obtained by this crossing, nineteen plants were grown, all but one of which produced double flowers. Five of them bore yellow flowers of various lighter and deeper shades, eight bore magenta flowers, four bore scarlet flowers, and two white-striped flowers. In another trial the pollen used was taken from a flower of the same variety—in this case a yellow-striped one—and the seedlings all showed yellow-striped flowers, although they varied somewhat in shade. This seems to indicate that for the production of varieties distinct in color, cross-fertilization is a necessity.

The excessive accumulation of garden varieties of favorite plants is illustrated by the fact that a recently-published German catalogue, devoted entirely to Zonal and Ivy-leaved Geraniums, contains 291 entries. It likewise gives amusing proof of the difficulty of finding names for so many varieties. In addition to the many "Glorias" and "Queens" and "Marvels" of one thing and another, we find plants named for a multitude of botanists, horticulturists and lady clients; then the names of living artists are lavishly drawn upon; celebrities of all kinds follow in curious conjunction, such as General Gordon, Toussaint L'Ouverture, Walter Scott, Count Herbert Bismarck, Leonidas, The Cid, De Lesseps, M. Eiffel and Horace Greeley—General Boulanger, by the way, being unaccountably absent; and at last the tradesman's ingenuity has been driven to such expedients as Nemesis, Electric Light, Divine Comedy, Walküre, Red Sea and Centaur.

The first flower-show ever held in Detroit was opened on April 2d, and continued for three days. The display is said to have been most excellent, and it is pleasing to know that the enterprise was commercially most successful. It was organized by Mr. Brearley, proprietor of the Detroit *Journal*, assisted by twenty ladies connected with as many charitable institutions. As a result of this novel yet sensible plan, 4,000 tickets of admission were sold the first day at a price of twenty-five cents each, and more than 19,000 on the succeeding days. The exhibition was held in a large rink, and each of the charities represented had its own booth for the sale of flowers. Most of the plants were effectively grouped in large masses of allied sorts, and the florists who signified their intention of showing decorative arrangements were consulted with regard to the prevailing color they would select, and rooms were furnished for them in a harmonious way.

Thousands of people are now visiting every day the Public Garden in Boston to enjoy the spring flowers which are lavishly displayed there. The great show will come a little later, when the Tulips are blooming. At present the feature is the Hyacinths, which have been brought forward under glass and are now plunged in full bloom into beds previously carpeted with Daisies or with Pansies. Thousands of Hyacinths are used in this way, and this fact will serve to illustrate the expensive manner in which this garden is carried on. The flowers last a few days only, and then the plants, which were first imported from Europe, then potted, then stored away for the winter, then brought forward under glass, then carted to the garden and plunged into beds, are to be thrown away. The sight of all these masses of Hyacinths is a beautiful one no doubt, but the result is hardly commensurate with the expenditure of labor and money. There are certain beds in which very dark blue Hyacinths are alternated with *Narcissus Pseudo-Narcissus*. The combination of colors in these beds is admirable, and the effect which these flowers together produce is as fine as anything of the kind which can be seen. A bed in which the same yellow-flowered Narcissus is mingled with a pale pink-flowered Hyacinth is almost as unsuccessful as the others are successful. It is pleasant to note that some of the superfluous flower-beds have quietly disappeared from the garden, that there are fewer of the horticultural curiosities scattered about, and that the garden generally gives promise of greater simplicity of decoration. There is a pile of rocks in a conspicuous place, however, thickly planted with garden Tulips (the garden Tulip is a flower of the parterre, if it is anything), which is calculated to give a shock to the stoutest heart. But perhaps it is an object lesson, intended to illustrate how not to make a rockery, and how not to plant Tulips. That Mr. Doogue knows how to plant Tulips the beds near the Commonwealth Avenue entrance and along the central walk will, if they are as good as they have been in recent years, abundantly demonstrate. Bostonians will have much to enjoy in the garden during the next two or three weeks.